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Remarks

This Amendment is responsive to the January 24, 2006 Office Action. Reexamination and reconsideration of claims 21-28 is respectfully requested.

Summary of The Office Action

Claims 21-28 were rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut (US Patent 5,740,018).

Claims 24 and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rumbut.

Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Quernemoen (US patent 6,453,169) in view of Rumbut.

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The Claims Patentably Distinguish Over the References of Record

35 U.S.C. §102

For a 35 U.S.C. §102 reference to anticipate a claim, the reference must teach every element of the claim. Section 2133 of the MPEP recites:

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987).

Here, the reference does not teach a liquid cooled modular electronics system that includes both a **sealed** electronic module(s) and a **detachably connected** liquid cooling module(s). The reference describes a cabinet into which liquid cooled modules may be placed. It does not teach that each of these modules can be individually sealed with respect to various factors (e.g., electromagnetic interference). While the reference teaches that the cabinet may provide some protection from some elements, having the cabinet provide some protection does not teach having each individual sealed electronics module provide protection.

The reference also illustrates an external liquid cooling component 250 that is integrated into the cabinet (e.g., permanently attached, welded). Component 250 is not illustrated being detachably connected to the cabinet. Component 250 is not illustrated as being mountable in cabinet 200. Thus, the reference illustrates an example of the prior art that has a fixed cooling capacity and to which additional liquid cooling components cannot be readily added.

35 U.S.C. §103

To establish a prima facie case of 35 U.S.C. §103 obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. MPEP 2143.01 Second, there must be a reasonable expectation of success. MPEP 2143.02 Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP 2143.03

Here, the third criteria described in MPEP 2143.03 is not satisfied since the combination of references does not teach or suggest all the claim limitations. None of the references, alone

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and/or in combination, teach a system having both sealed electronics modules and a detachably connected liquid cooling modules. Thus, none of the claims are obvious for at least this reason.

Ascertaining Skill Level of One Skilled In The Art

The MPEP requires that the Office Action ascertain and describe the level of ordinary skill so that objectivity can be maintained. MPEP §2141.03 reads:

The importance of resolving the level of ordinary skill in the art lies in the necessity of maintaining objectivity in the obviousness inquiry. *Ryko Mfg. Co. v. Nu-Star, Inc.*, 950 F.2d 714, 718, 21 USPQ2d 1053, 1057 (Fed. Cir. 1991). The examiner must ascertain what would have been obvious to one of ordinary skill in the art at the time the invention was made, and not to the inventor, a judge, a layman, those skilled in remote arts, or to geniuses in the art at hand. *Environmental Designs, Ltd. v. Union Oil Co.*, 713 F.2d 693, 218 USPQ 865 (Fed. Cir. 1983), *cert. denied*, 464 U.S. 1043 (1984).

Here the Office Action neither ascertains nor reports on the level of ordinary skill in the art. For this additional reason all the obviousness rejections are improper.

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Claims will now be discussed individually.

Independent Claim 21

Claim 21 was rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut. Claim 21 is directed to a liquid cooled modular electronics system that includes both a **sealed** electronics module(s) and a **detachably connected** liquid cooling module(s).

The reference does not disclose a “sealed” electronics module. The reference discloses a cabinet 200 that may house “unsealed” electronics modules (e.g., board 150, pack 100). The unsealed electronics module may be cooled by liquid provided by integrated pump 250. This is similar to the prior art described in Figure 2 of the application. It is not similar to the claimed system that includes both a sealed electronics module(s) and a detachably connected liquid cooling module.

Concerning the liquid cooling module being detachably connected, the Office Action identifies elements 212 and 218 as teaching the claimed connectors that provide the claimed detachable feature. The application defines “detachable connection” as follows:

A “detachable connection”, or a connection by which entities may be “detachably connected”, is one that facilitates attaching and detaching a first entity to a second entity. For example, a hose that is screwed onto a spigot is detachably connected. Similarly, an electrical receptacle configured to receive an electrical plug provides a detachable connection for the plug.

Elements 212 and 218 are clearly not “detachable” as defined and claimed since they are integrated into both pump 250 and cabinet 200. These elements appear to be part of the cabinet 200 and pump 250 assembly. There appears to be no way to disconnect these elements without using a hacksaw. Thus these elements do not anticipate a “detachable connection”. A detachable connection facilitates logically decoupling liquid cooled modules, liquid cooling modules, and the supporting structure (e.g., rack) into which the cooled modules and cooling modules can be placed. This decoupling simplifies cooling requirements design. In the reference, pump 250 appears permanently coupled to cabinet 200, which does not teach the decoupled approach illustrated, for example, in Figures 3 and 4.

The reference identifies pack 100 as being the electronics module. Neither board 150 nor pack 100 is sealed with respect to any of the claimed attributes. Recall that the application

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speaks directly to the “sealed” nature of the electronics module. For example, the application describes, in paragraph [0033], that the electronics module may be sealed with respect to electromagnetic interference, static electricity, condensation, foreign objects, and so on. Here, board 150 and pack 100 may be susceptible to all of these elements. While cabinet 200 may provide some protection from some elements, providing protection in an external component like cabinet 200 does not transform unsealed board 150 or unsealed pack 100 into a sealed module.

Additionally, the Office Action identifies element 103 (Figure 1) as teaching the claimed “means arranged within the liquid cooling module for providing the cooled liquid to one or more sealed electronic modules.” This is internally inconsistent. Element 103 is located in what the Office Action describes as the sealed electronics module 100, not in the liquid cooling module, which the Office Action describes as pump 250. Thus, the reference does not teach this element.

Since claim 21 recites features not taught or suggested by the reference, claim 21 patentably distinguishes over the reference and is allowable.

Dependent Claims 22-28

Claims 22-28 were rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut. Claims 22-28 depend from claim 21. Claim 21 has been shown to be not anticipated. Accordingly, dependent claims 22-28 are not anticipated for at least these reasons and are allowable.

Claim 22

Claim 22 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 22 recites that sealed electronics modules can be **dynamically operably connected** to second liquid cooled electronics modules. The Office Action asserts that elements 209 and 212 can operably connect the two electronics modules. The application defines “operably connected” as meaning:

An “operable connection”, or a connection by which entities are “operably connected”, is one in which signals, physical communication flow, and/or logical communication flow may be sent and/or received. Typically, an operable connection includes a physical interface, an electrical interface, and/or a data interface, but it is to be noted that an operable connection may include differing combinations of these or other types of connections **sufficient to allow operable control**.

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Elements 209 and 212 appear to be plumbing parts that facilitate moving liquid. Thus, elements 209 and 212 do not "operably connect" the two electronics modules because this plumbing interface is insufficient to allow operable control. For this additional reason this claim is not anticipated and is allowable.

Claim 23

Claim 23 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 23 recites that sealed electronics module is sealed with respect to electromagnetic interference. The Office Action asserts that claim 4 teaches the electronics module being sealed. However, claim 4 teaches that the sealable enclosure is fabricated with electrostatic and electromagnetic shielding material. While fabricating the sealable enclosure with some shielding material may provide some protection, it may not "seal" the module as claimed and described. The application provides one example where "sealed" means:

that substantially all such waves are prevented from affecting electronic components within the electronics module 300 [and/or] substantially all such waves are prevented from leaving the electronics module 300.

The module described in the application teaches no such limitation. For this additional reason this claim is not anticipated and is allowable.

Claim 24

Claim 24 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 24 recites that the electronics components include one or more of, a microprocessor, a memory chip, a controller chip, and a power subsystem component. The Office Action provides no rationale why claim 24 is rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut. This provides Applicant with no meaningful opportunity to rebut the specific reasons for the rejection. For this reason this rejection is improper and should be removed, leaving claim 24 not anticipated and allowable.

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Claim 26

Claim 26 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 26 recites that the electronics system is a scalable M processor server. The Office Action provides no rationale why claim 26 is rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut. This provides Applicant with no meaningful opportunity to rebut the specific reasons for the rejection. For this reason this rejection is improper and should be removed, leaving claim 26 not anticipated and allowable.

Claim 27

Claim 27 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 27 recites that the liquid cooled modular electronics system includes a rack configured to mount sealed electronics modules and liquid cooling modules. The Office Action asserts that cabinet 200 teaches this element in combination with pump 250. If, as the Office Action asserts, the pump 250 teaches the liquid cooling module, then pump 250 should be mountable in cabinet 200. While cabinet 200 can mount packs 100, it is unclear how cabinet 200 could mount pump 250 in a rack slot. Indeed, from the figures and description, it appears impossible to disconnect pump 250 and insert it into cabinet 200. For this additional reason this claim is not anticipated and is allowable.

Claim 28

Claim 28 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 28 recites that the electronics system includes one or more liquid cooling modules arranged in a redundant, fail-over system. A single element cannot be configured in a redundant fail-over system. Yet the reference describes only a single cooling module 250. The Office Action provides no rationale why claim 28 is rejected under 35 U.S.C. §102(b) as being anticipated by Rumbut. This provides Applicant with no meaningful opportunity to rebut the specific reasons for the rejection. For this reason this rejection is improper and should be removed, leaving claim 28 not anticipated and allowable.

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Claims 24 and 28, 35 U.S.C. §103(a)

Claims 24 and 28 were rejected under 35 U.S.C. §103(a) as being unpatentable over Rumbut. Claims 24 and 28 depend from claim 21. Claim 21 is not obvious, as illustrated below, and thus claims 24 and 28, which depend therefrom, are similarly not obvious.

Claim 21 is directed to a liquid cooled modular electronics system that includes a **detachably connected** liquid cooling module. Concerning the liquid cooling module being detachably connected, the Office Action identifies elements 212 and 218 as teaching the claimed connectors that provide the claimed detachable feature. The application defines "detachable connection" as follows:

A "detachable connection", or a connection by which entities may be "detachably connected", is one that facilitates attaching and detaching a first entity to a second entity. For example, a hose that is screwed onto a spigot is detachably connected. Similarly, an electrical receptacle configured to receive an electrical plug provides a detachable connection for the plug.

Elements 212 and 218 are not detachable since they are integrated into both pump 250 and cabinet 200. These elements appear as permanently connected parts of the cabinet 200 and pump 250 assembly. There appears to be no reversible way to disconnect these elements as required in a detachable connection. Thus these elements do not anticipate a "detachable connection". Since claim 21 recites features not taught or suggested by the reference, claim 21 patentably distinguishes over the reference and is not obvious.

Claim 24

Claim 24 depends from claim 21. Claim 21 has been shown to be not obvious. Thus, this claim is similarly not obvious and is allowable. Additionally, claim 24 recites that the electronics components include one or more of, a microprocessor, a memory chip, a controller chip, and a power subsystem component. The Office Action asserts that it is obvious to provide these types of electronics components on a circuit board. However, the Office Action does not assert to whom this would be obvious, and does not ascertain the skill level of the person to whom this would be obvious. The Office Action simply takes "Official Notice" of this fact, without providing a reference showing these types of components being located in a "sealed"

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electronics module that is being liquid cooled. For this additional reason this rejection is improper and should be removed, leaving claim 24 not obvious and allowable.

Claim 28

Claim 28 depends from claim 21. Claim 21 has been shown to be not anticipated. Thus, this claim is similarly not anticipated and is allowable. Additionally, claim 28 recites that the electronics system includes one or more liquid cooling modules arranged in a redundant failover system. A redundant failover system requires two or more liquid cooling modules. The Office Action asserts it would be obvious to configure the liquid cooling modules in Rumbut in a redundant failover system. However, Rumbut only teaches a **single cooling module, pump 250**. It appears impossible to configure a single pump 250 in a redundant failover system. It also appears impossible to add an additional liquid cooling module to system 200. Recall that paragraph [0048] of the application reads:

In one example, the cooling module 510 may be configured to be in liquid communication with another liquid cooling module(s). For example, three liquid cooling modules may be arranged in series.

There appears to be no way that pump 250 could be placed in liquid communication with another liquid cooling module(s). For this reason this rejection is improper and should be removed, leaving claim 28 not obvious and allowable.

Claim 26, 35 U.S.C. §103(a)


Claim 26 was rejected under 35 U.S.C. §103(a) as being unpatentable over Quernemoen in view of Rumbut. Claim 21 has been shown to be not obvious over Rumbut. Quernemoen does not remedy the defect of Rumbut because it does not teach the missing detachable connection. Thus, claim 21 remains unobvious over Rumbut and Quernemoen. Claim 26 depends from claim 21. Thus, this claim is similarly not obvious and is allowable.

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Conclusion

For the reasons set forth above, claims 21-28 patentably and unobviously distinguish over the references and are allowable. An early allowance of all claims is earnestly solicited.

Respectfully submitted,



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